



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/725,165	11/29/2000	Jose Geraldo Furtado Ramos	2764-34	8558

23117 7590 07/19/2005

NIXON & VANDERHYE, PC  
901 NORTH GLEBE ROAD, 11TH FLOOR  
ARLINGTON, VA 22203

EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
----------	--------------

1764

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/725,165

Applicant(s)

RAMOS ET AL.

Examiner

Jennifer A. Leung

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005 and 22 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 15, 2005 has been entered.

### ***Response to Amendment***

2. Applicant's amendment submitted on June 15, 2005 and supplementary amendment submitted on June 22, 2005 has been received and carefully considered. Claim 2 is cancelled. Claims 1 and 3-6 remain active.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Jones (US 2,634,191).

Jones (FIG. 1-3) discloses, "Solids removed from the effluent gases by the cyclones are returned through a pipe to the fluid bed. This pipe, commonly called a 'dip-leg,' *extends below the surface of the bed* in order to provide a seal against gases which might otherwise be blown upwardly in the dip-leg and prevent proper action of the cyclone. In some installation *cyclones in multiple are used discharging solids into a common dip-leg.*" (column 1, lines 32-48). Also,

Art Unit: 1764

Jones discloses, "It is *desirable to terminate dip-leg 16 with a bend 20* to act as a baffle against bubbles of air rising through the catalyst bed," (column 4, lines 36-39), wherein bend 20 comprises a "radius-curved single leg termination." Jones discloses leg termination 20 being devoid of movable sealing parts, such being desirable because the mechanically operated dampers of the prior art tended to jam during filling or cause an undesirable restriction to the normal flow of solids during operation (column 2, lines 9-17). In contrast, Jones (FIG. 2) discloses a single leg termination 20 being sealed by means of a metal plate 19 temporarily held across the outlet of dip-leg 16 by a fusible link 21 whose melting point is at, or somewhat below, the normal operating temperature. The sealing means may also comprise a seal composed either partly or wholly of a material that will fuse or otherwise rupture or disintegrate at the desired temperature (column 2, lines 24-55). Therefore, "During normal operation of the unit, *dip-legs 11 and 16 are open at the lower ends* [being devoid of movable sealing parts] to permit return of catalyst from the cyclones to the fluid bed. In Figure 1, dip-legs 16 of secondary cyclones 13 are shown closed by plates 19 to illustrate the situation occurring according to the invention when catalyst is being introduced into the regenerator during starting up the plant." (column 3, lines 27-51). To reiterate, during the mode of normal operation, the dip legs *are devoid of movable sealing parts*, being that the plate 19 has fallen off, or the plate 19 has fused, ruptured, or disintegrated.

Instant claim 1 structurally reads on the apparatus of Jones.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 1764

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (U.S. 2,634,191) in view of Danielsen et al. (U.S. 4,996,028).

Jones is silent as to the specifically recited ratio of radius-to-diameter for the single leg termination **20** (FIG. 1-3). In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a ratio of 1.0 to 3.0 for the ratio of radius-to-diameter for the single leg termination in the apparatus of Jones, since the specific ratio is not considered to confer patentability to the claim since the precise ratio would have been considered a result effective variable by one having ordinary skill in the art. Accordingly, one having ordinary skill in the art would have routinely optimized the ratio of radius-to-diameter in order to obtain a desired solids level within the cyclone diplegs, *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Danielsen et al. is further provided to evidence the conventionality of providing a single leg termination to the distal end of a cyclone dipleg according to the recited configuration, wherein, "... the radius of curvature of the tubular body portion **25** preferably is in the range of from *about 1 1/2 times to about 2 1/2 times* the diameter of the tubular body portion **25**." Maintaining a pre-determined, sufficient, radius of curvature increases, under conditions of use, the stability of the dipleg solids level over that of diplegs having straight run tubular body portions, as taught by Danielson. (column 3, lines 2-10; FIG. 1-2).

5. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (U.S. 2,634,191) in view of Luckenbach (U.S. 4,074,691).

Regarding claim 4, although Jones is silent as to bend **20** (FIG. 1-3) being constructed

Art Unit: 1764

from a succession of straight tube sections arranged in an arcuate array, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select such a construction for the bend in the apparatus of Jones, since substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). To evidence the conventionality of such construction, Luckenbach (FIG. 1) teaches a cyclone comprising a dipleg 16 having a leg termination constructed of a pair of interconnected angularly disposed conduit members 12 and 14, the upper one of which is lineal and connected with the lower vertical portion of the cyclone dipleg 16.

Regarding claim 5, as seen in the Figure 2 of Jones, the bend 20 of dipleg 16 inherently directs the flow of descending mass of solids into a plane orthogonal to the ascending gaseous flow, by virtue of the total angle subtended by bend 20.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (U.S. 2,634,191).

Jones only illustrates the configuration of “cyclones in series, or series-parallel... with individual diplegs,” (column 1, lines 46-48; FIG. 1). However, if accordingly modified to comprise the disclosed, “cyclones in multiple... discharging solids into a common dip-leg,” (column 1, lines 32-46), the discharge end (defined by plate 19) of the dipleg 16 would *inherently* lie on the side opposite the junction of the primary and secondary cyclone diplegs 16 and 11, respectively. Additionally, the junction would inherently be located at a higher elevation than the distal end of the radius-curved termination. Although Jones is silent as to the vertical distance between the junction and discharge end, it would have been obvious for one of ordinary

Art Unit: 1764

skill in the art at the time the invention was made to select an appropriate distance (such as the recited range) between the junction and the discharge end in the apparatus of Jones, on the basis of suitability for the intended use and absent showing any unexpected results, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

7. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US 4,422,925) in view of Jones (U.S. 2,634,191).

Regarding claim 1, Williams (FIG.) discloses an apparatus comprising:  
a cyclone separator leg **41** which joins the lower end of the leg of a secondary cyclone **80** and the leg of a primary cyclone **40** to form a single primary and secondary cyclone leg complex where solids collected by both cyclones are combined, wherein the separator leg **41** is immersed in a fluidized bed of particles **35** and appearing to be devoid of movable sealing parts. Williams further discloses other cyclones **13**, **33** of the apparatus having legs **76**, **78** terminating distally with a suitable gas seal such as the known J-seal illustrated (i.e., a radius curve), appearing to be devoid of movable sealing parts (column 7, line 67 to column 8, line 14). Williams, however, is silent as to the separator leg **41** also terminating distally in a known J-seal or radius curve, devoid of movable sealing parts. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide a known J-seal or radius curve to the distal end of separator leg **41** in the apparatus of Williams, on the basis of suitability for the intended use and absents showing any unexpected results thereof, because the duplication of parts merely involves routine skill in the art. Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide a known J-seal or

Art Unit: 1764

radius curve to the distal end of separator leg **41** in the apparatus of Williams, because it is desirable to terminate diplegs with a radius curve to act as a baffle against bubbles of air rising through the catalyst bed, as taught by Jones (column 4, lines 36-39). In particular, Jones (FIG. 1) teaches a cyclone separator leg **16** terminating distally in a radius curve (i.e., bend **20**) being devoid of movable sealing parts during normal operation.

Regarding claim 6, as shown in the Figure, Williams et al. discloses that a junction of the leg of the primary cyclone **40** and the leg of the secondary cyclone **80** lies on the side opposite a distal end of the dipleg **41**, and at a higher level than the distal end of the dipleg **41**. Although Williams et al. is silent as to the vertical distance between the junction and discharge end, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate distance (such as the recited range) between the junction and the discharge end in the modified apparatus of Williams et al., on the basis of suitability for the intended use and absent showing any unexpected results, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US 4,422,925) in view of Jones (U.S. 2,634,191), as applied to claim 1 above, and further in view of Danielsen et al. (U.S. 4,996,028).

The collective teaching of Williams et al. and Jones is silent as to the specifically recited ratio of radius-to-diameter for the single leg termination. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a ratio of 1.0 to 3.0 for the ratio of radius-to-diameter for the single leg termination in the modified



Art Unit: 1764

apparatus of Williams et al., since the specific ratio is not considered to confer patentability to the claim since the precise ratio would have been considered a result effective variable by one having ordinary skill in the art. Accordingly, one having ordinary skill in the art would have routinely optimized the ratio of radius-to-diameter in order to obtain a desired solids level within the cyclone diplegs, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Danielson et al. is further provided to evidence the conventionality of providing a single leg termination to the distal end of a cyclone dipleg according to the recited configuration, wherein, "... the radius of curvature of the tubular body portion 25 preferably is in the range of from *about 1 1/2 times to about 2 1/2 times* the diameter of the tubular body portion 25." Maintaining a pre-determined, sufficient, radius of curvature increases, under conditions of use, the stability of the dipleg solids level over that of diplegs having straight run tubular body portions, as taught by Danielson. (column 3, lines 2-10; FIG. 1-2).

9. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US 4,422,925) in view of Jones (U.S. 2,634,191), as applied to claim 1 above, and further in view of Luckenbach (U.S. 4,074,691).

Regarding claim 4, although the collective teaching of Williams et al. and Jones is silent as to the radius curve being constructed from a succession of straight tube sections arranged in an arcuate array, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select such a construction for the radius curve in the modified apparatus of Williams et al., since substitution of known equivalent structures involves only

Art Unit: 1764

ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). To evidence the conventionality of such construction, Luckenbach (FIG. 1) teaches a cyclone comprising a dipleg 16 having a leg termination constructed of a pair of interconnected angularly disposed conduit members 12 and 14, the upper one of which is lineal and connected with the lower vertical portion of the cyclone dipleg 16.

Regarding claim 5, as evidenced in the Figure 2 of Jones, a radius curve inherently directs the flow of descending mass of solids into a plane orthogonal to the ascending gaseous flow, by virtue of the total angle subtended by bend 20.

#### ***Response to Arguments***

10. Applicant's arguments filed on June 15, 2005 have been fully considered but they are not persuasive. On page 6, first paragraph of the response, Applicants argue,

“The Examiner cites column 1, lines 32-48 of Jones as allegedly teaching multiple cyclones discharging solids into a common dip-leg. It is respectfully noted that the cited passage in Jones is a general description of the prior art; Jones does not illustrate or disclose such a joiner having a single leg termination that is radiused... The fact that Jones acknowledges that there are prior art installations where cyclones in multiple discharge solids to a common dip leg does not mean *ipso facto* that Jones is advocating the provision of a radius curve at the termination of a separator leg which joins two dip legs.... Thus, Jones may teach that there are known installations where plural cyclones discharge into a common dip leg, but that is in an entirely separate context that Jones discloses a curved dip leg end...”

The Examiner respectfully disagrees and maintains that the apparatus of Jones structurally reads on the apparatus as claimed. In particular, claim 1 currently recites,

Art Unit: 1764

*“A **termination system** for joining and sealing the lower end of the leg of a secondary cyclone and the leg of a primary cyclone, **comprising:***

*a cyclone separator leg which joins the lower end of the leg of a secondary cyclone and the leg of a primary cyclone to form a single primary and secondary cyclone leg complex where solids collected by both cyclones are combined, **said separator leg terminating distally in a radius curved single leg termination** that is immersed in a fluidized bed of particles and **devoid of movable sealing parts**, wherein said collected and combined solids are discharged from said separator leg through said radius curved single leg termination.”*

Only elements in **bold** are given patentable weight. Note that the recitation *italicized*, “for joining and sealing the lower end of the leg of a secondary cyclone and the leg of a primary cyclone,” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Additionally, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963). The prior art structure of Jones is capable of performing the intended use of joining and sealing the lower end of the leg of a secondary cyclone and the leg of a primary cyclone because the structure provides a means whereby the dip legs of cyclones may be sealed (column 2, lines 24-

Art Unit: 1764

55), wherein the cyclones would include various arrangements of cyclones and dip-legs in the art, e.g., cyclones in multiple discharging solids into a common dip-leg (column 1, lines 44-46).

Beginning on page 6, second paragraph of the response, Applicants further argue,

“... Jones’ invention specifically provides for a mechanical closure on the dip leg that is selectively released and, thus, expressly teaches a movable sealing part.

The Examiner asserts that Jones’ sealing plate is only present when the catalyst is introduced and is only temporary and will be removed during operation by the presence of a weight to pull a metal plate out of position or by forming the sealing means from a material that will partly or wholly fuse or rupture or disintegrate. However, the Examiner has by this admission acknowledged that Jones does teach a mechanical sealing part for the distal end of his dip leg and does teach that at least a part of the mechanical closure is movable. As such, Jones does not anticipate a distal termination that is devoid of movable sealing parts.”

The Examiner respectfully disagrees. During the mode of normal operation, the lower end of the dipleg is completely open to permit the return of catalyst from the cyclones to the fluid bed (i.e., being that the sealing means has disintegrated or has been completely removed upon reaching the operating temperature). During the mode of normal operation, the dipleg is devoid of movable sealing parts. Thus, during the mode of normal operation, the apparatus of Jones structurally meets the claim.

Furthermore, Jones distinguishes his invention from the undesirable, mechanical-type or movable sealing parts as argued by applicants. In particular, Jones states in column 2, lines 9-18,

“Although dampers, operated by distant control from outside the vessel, have been used to close the dip-legs during the filling operation, the controls have a tendency to jam, the control rods require packing glands in the vessel walls, and the dampers even when open react and undesirable restriction to the normal flow of solids in the dip-legs under

operating condition.”

On page 7, third paragraph, Applicants argue,

“... Danielson ... teaches away from the invention by providing a movable sealing part at the distal end of the leg structure.”

The Examiner respectfully disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

On page 7, fifth and sixth paragraphs, Applicants argue,

“... Luckenbach ... teaches away from the claimed invention because Luckenbach discloses movable sealing parts in direct contradiction to the combination claimed in applicant’s claim 1 and the claims dependent therefrom.”

“... Luckenbach provides no teaching or suggest whatsoever regarding using straight pipe sections to form a radius curve. In fact, if Luckenbach’s teachings were followed in Jones, then Jones would provide a single straight segment at an incline as depicted in Luckenbach, rather than the single curved pipe Jones discloses.”

The Examiner respectfully disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Thew (WO 89/02785) is further provided to illustrate the state of the art.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung  
July 13, 2005 *JAL*

*Hien Tran*  
**HIEN TRAN**  
**PRIMARY EXAMINER**